Catalogue no. 82-003-X
ISSN 1209-1367

Health Reports

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Release date: March 15, 2017

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0[s] value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
[p] preliminary
[r] revised
x suppressed to meet the confidentiality requirements of the *Statistics Act*
[E] use with caution
F too unreliable to be published
* significantly different from reference category ($p < 0.05$)

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Medically unexplained physical symptoms (MUPS) among adults in Canada: Comorbidity, health care use and employment

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Abstract

Based on data from the 2014 Canadian Community Health Survey and the 2012 Canadian Community Health Survey-Mental Health, this study provides estimates of the prevalence of medically unexplained physical symptoms (MUPS) in the household population aged 25 or older. MUPS are examined in relation to sociodemographic characteristics, physical and mental comorbidity, health care use and unmet needs, labour force participation and productivity. In 2014, 5.5% of Canadian adults—an estimated 1.3 million – reported having chronic fatigue syndrome (1.6%), fibromyalgia (2.0%) and/or multiple chemical sensitivity (2.7%). Half (51%) of people with MUPS reported other chronic physical conditions, compared with 8% of those without MUPS. Similarly, mental comorbidities were more prevalent among those with MUPS. Higher health care use was observed among people with MUPS, but 25% of them reported unmet health care needs, compared with 11% of those without MUPS. People with MUPS were more likely than those without MUPS to be permanently unable to work or to not have a job; fewer than half (45%) were employed. Among those who were employed, 18% had missed work because of a chronic condition, compared with 5% of workers without MUPS.

Keywords: Chronic fatigue syndrome, fibromyalgia, mental disorders, multiple chemical sensitivities

Certain physical symptoms do not appear to have a distinct etiology or "hard" pathophysiological findings.[1] These symptoms are called *medically unexplained physical symptoms* (MUPS). The lack of consistent explanations from physical and laboratory assessments has caused confusion and controversy about these conditions.[2-6] MUPS can affect daily functioning,[2,3,7] interfere with work productivity,[8,9] and result in considerable use of health care resources.[2,9]

Although an array of syndromes falls under the rubric of MUPS,[1] discussion is often limited to chronic fatigue syndrome, fibromyalgia and multiple chemical sensitivity. These conditions' similarity of symptoms and procedures for clinical diagnosis, along with extensive research on each of them, suggest that they merit focused, comparative study.[10,11]

Extreme tiredness is the most salient symptom of *chronic fatigue syndrome*; a diagnosis tends to be given only when other conditions with similar symptoms have been ruled out. The diagnostic criterion for *fibromyalgia* is pain lasting three months or more in at least 11 of 18 specified areas. The pain is often accompanied by symptoms common to chronic fatigue syndrome. People who suffer from *multiple chemical sensitivity* develop a variety of symptoms when they are exposed to synthetic chemicals, such as changes in heart rate, difficulty breathing, rashes, nausea, headache and confusion.[9-14]

Based on data from the 2014 Canadian Community Health Survey (CCHS) and the 2012 Canadian Community Health Survey—Mental Health (CCHS—MH), this study provides estimates of MUPS prevalence in the household population. Because of the low prevalence of MUPS at younger ages and the inclusion of labour force variables, the analysis focused on people aged 25 or older. MUPS are examined in relation to sociodemographic characteristics, physical and mental comorbidity, health care use and unmet needs, labour force participation and productivity.

Prevalence

In 2014, 5.5% of Canadians aged 25 or older—1.3 million—reported one or more of the three MUPS conditions: 1.6% reported chronic fatigue syndrome; 2.0%, fibromyalgia; and 2.7%, multiple chemical sensitivity (Table 1). Women were more than twice as likely as men to report each disorder. At 3%, the overall prevalence of MUPS was lower among 25- to 44-year-olds than among older age groups: 7% at ages 45 to 59; 8% at ages 60 to 74; and 7% at age 75 or older. These age/sex patterns were similar for each condition.

Individuals without postsecondary graduation were more likely than those with a postsecondary diploma or degree to have chronic fatigue syndrome and fibromyalgia. The likelihood of reporting multiple chemical sensitivity was not associated with education.

Prevalence also varied with household income. For instance, 3.3% of people in the lowest household income quintile had chronic fatigue syndrome versus 0.7% of those in the highest income quintile.

Divorced/Separated/Widowed individuals were almost twice as likely as those who were married/common-law to report MUPS: 9.1 % compared with 4.8%. The same pattern was evident for each of the three conditions. In addition, white

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Table 1
Prevalence of medically unexplained physical symptoms (MUPS), by selected characteristics, household population aged 25 or older, Canada, 2014

	Any MUPS				Chronic fatigue syndrome				Multiple chemical sensitivity				Fibromyalgia			
			95% confidence interval				95% confidence interval				95% confidence interval				95% confidence interval	
Characteristic	Number 000s	%	from	to	Number 000s	%	from	to	Number 000s	%	from	to	Number 000s	%	from	to
Total	1,348.9	5.5	5.2	5.8	389.9	1.6	1.4	1.8	671.5	2.7	2.5	3.0	500.3	2.0	1.8	2.3
Sex																
Men†	369.4	3.1	2.8	3.4	145.8	1.2	1.1	1.4	169.6	1.4	1.2	1.7	88.5	0.7	0.6	1.0
Women	979.5	7.8*	7.3	8.4	244.2	1.9*	1.7	2.2	501.9	4.0*	3.6	4.4	411.8	3.3*	3.0	3.7
Age group																
25 to 44†	266.8	2.8	2.5	3.2	86.9	0.9	0.7	1.2	138.4	1.5	1.2	1.8	74.8	0.8	0.6	1.0
45 to 59	485.9	6.5*	5.8	7.2	123.8	1.6*	1.4	2.0	230.0	3.1*	2.6	3.5	208.4	2.8*	2.3	3.3
60 to 74	448.1	8.1*	7.5	8.8	131.7	2.4*	2.0	2.8	230.7	4.2*	3.7	4.7	177.1	3.2*	2.8	3.7
75 or older	148.2	7.3*	6.3	8.3	47.7	2.3*	1.9	2.8	72.4	3.5*	2.8	4.4	40.0	1.9*	1.5	2.5
Highest level of household education																
Postsecondary graduation†	745.3	4.8	4.5	5.2	197.7	1.3	1.1	1.5	402.3	2.6	2.3	2.9	268.5	1.7	1.5	2.0
Less than postsecondary graduation	579.3	6.7*	6.2	7.3	184.9	2.1*	1.8	2.5	255.3	3.0	2.6	3.3	225.8	2.6*	2.2	3.1
Household income quintile																
1 (lowest)†	390.7	8.7	7.8	9.7	149.8	3.3	2.8	4.0	172.4	3.8	3.3	4.5	150.9	3.3	2.8	2.8
2	310.9	6.4*	5.7	7.1	91.1	1.9*	1.5	2.3	146.2	3.0*	2.5	3.5	124.1	2.5*	2.1	2.1
3	243.7	5.0*	4.4	5.8	60.4	1.2*	1.0	1.6	139.4	2.9*	2.4	3.4	82.5	1.7*	1.3	1.3
4	231.4	4.6*	3.9	5.4	50.0	1.0*	0.8	1.3	111.1	2.2*	1.8	2.7	91.2	1.8*	1.3	1.3
5 (highest)	167.9	3.3*	2.8	3.8	37.8	0.7*	0.6	0.9	99.1	1.9*	1.6	2.3	51.1	1.0*	0.8	0.8
Marital status																
Married/Common-law†	808.4	4.8	4.4	5.2	217.8	1.3	1.1	1.5	402.9	2.4	2.1	2.6	301.4	1.8	1.5	2.0
Widowed/Separated/Divorced	332.6	9.1*	8.2	10.1	93.0	2.5*	2.2	3.0	159.3	4.3*	3.7	5.1	140.3	3.8*	3.2	4.6
Never married	203.1	5.3	4.6	6.0	75.8	2.0*	1.5	2.5	108.2	2.8	2.3	3.4	57.5	1.5	1.1	1.9
Cultural identity/Race																
White†	1,053.9	5.7	5.4	6.1	297.7	1.6	1.4	1.8	517.8	2.8	2.6	3.1	407.9	2.2	2.0	2.5
Non-white	245.9	4.7*	4.0	5.5	70.1	1.3	1.0	1.8	136.7	2.6	2.1	3.2	68.4	1.3*	1.0	1.7

* significantly different from reference category ($p < 0.05$)
† reference category
Source: 2014 Canadian Community Health Survey.

Canadians were more likely to report fibromyalgia than their non-white counterparts.

Comorbidity

Individuals often meet the diagnostic criteria for more than one of the three MUPS disorders.[1,10,11,15,16] Of those with chronic fatigue syndrome, 30% also had fibromyalgia, and 15% had multiple chemical sensitivity. Among individuals with fibromyalgia, 23% had chronic fatigue syndrome, and 13%, multiple chemical sensitivity. And among those with multiple chemical sensitivity, 9% had chronic fatigue syndrome, and 10% had fibromyalgia (data not shown in tables). This overlapping raises the question of whether MUPS, which may be unique in their etiologies, all result in a more or less "common manifestation" of symptoms.[1,3,16]

Substantial percentages of people with MUPS reported other physical conditions. Half of them (51%) had at least three non-MUPS chronic conditions; the corresponding figure for people who did not have MUPS was 13% (Table 2).

As well, those with MUPS were more likely than those without MUPS to report mood or anxiety disorders: 35% versus 10%.

Based on data from the 2012 CCHS—MH, the past 12-month prevalence of specific mental disorders among people with chronic fatigue syndrome or multiple chemical sensitivity was examined (the survey did not include fibromyalgia). A third (35%) of people with chronic fatigue syndrome and 19% of those with multiple chemical sensitivity met the criteria for at least one of six selected mental disorders—major depressive episode, bipolar disorder, generalized anxiety disorder, and abuse of/dependence on alcohol, cannabis or other drugs. This compared with 8% of respondents with neither chronic fatigue syndrome nor multiple chemical sensitivity.

Some research suggests that mental health problems can be brought on by the stress of having unexplained symptoms, and in many cases, MUPS precedes psychiatric symptoms.[17]

Table 2
Prevalence of physical and mental comorbidity, by medically unexplained physical symptoms (MUPS) status, household population aged 25 or older, Canada, 2012 (excluding territories) and 2014

	Any MUPS			Chronic fatigue syndrome			Multiple chemical sensitivity			Fibromyalgia			No MUPS		
		95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval	
Comorbidity	%	from	to	%	from	to	%	from	to	%	from	to	%	from	to
Non-MUPS chronic physical conditions															
None	9.8[E]*	8.2	11.6	6.0[E]*	4.2	8.6	12.5[E]*	10.1	15.3	5.7[E]*	3.7	8.8	45.7	44.9	46.5
One	18.4*	16.2	20.8	12.4*	9.2	16.4	24.7	21.3	28.5	10.9*	8.3	14.1	26.5	25.7	27.3
Two	21.1*	18.7	23.8	16.9	13.3	21.1	22.2*	19.0	25.8	19.9*	16.3	24.0	14.9	14.3	15.4
Three or more	50.7*	47.6	53.8	64.7*	59.5	69.6	40.6*	37.0	44.4	63.5*	58.7	68.1	12.9	12.5	13.4
Mental disorders[†]															
Major depressive episode	15.5*	12.4	19.1	26.2*	19.6	34.2	12.6*	9.6	16.3	...	...	...	3.8	3.4	4.2
Bipolar disorder	4.9[E]*	2.8	8.3	6.6[E]*	3.6	11.9	F	...	...	...	...	...	1.2	1.0	1.4
General anxiety disorder	10.7*	8.0	14.3	18.7[E]*	12.5	26.9	8.3[E]*	5.9	11.6	...	...	...	2.2	2.0	2.6
Substance[‡] use disorder	4.4[E]	2.9	6.6	6.8[E]*	3.8	11.8	3.6[E]	2.1	6.1	...	...	...	2.9	2.5	3.3
Any mental disorder	22.7*	18.8	27.2	34.7*	27.1	43.1	18.8*	14.7	23.8	...	...	...	7.6	7.0	8.2
Mood or anxiety disorder[§]	34.7*	31.8	37.6	54.3*	49.1	59.5	27.2*	24.1	30.6	40.9*	35.9	46.1	10.3	9.8	10.8

... not applicable
[E] interpret with caution
F too unreliable to be published
* significantly different from No MUPS ($p < 0.05$)
[†] based on data for 10 provinces from 2012 Canadian Community Health Survey–Mental Health, which did not collect data on fibromyalgia. "Any MUPS" includes only chronic fatigue syndrome and multiple chemical sensitivity; "No MUPS excludes only chronic fatigure syndrome and multiple chemical sensitivity
[‡] alcohol, cannabis, other drugs
[§] based on data from 2014 Canadian Community Health Survey
Sources: 2012 Canadian Community Health Survey–Mental Health; 2014 Canadian Community Health Survey.

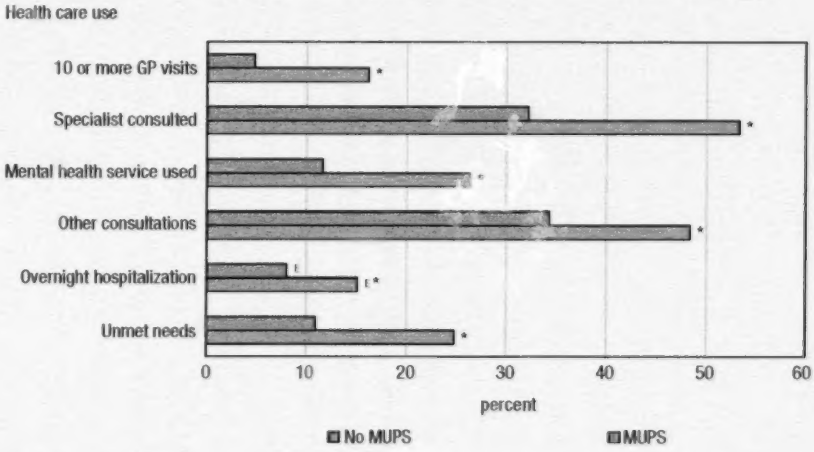
Health care use and unmet needs

In 2014, 16% of people with MUPS reported at least 10 consultations with a family doctor or general practitioner in the past year, this compared with 5% of people without MUPS (Figure 1). Half (53%) of people with MUPS consulted specialists, compared with a third (32%) of those without MUPS. A quarter (26%) of people with MUPS used mental health services versus 12% of those without MUPS. Individuals with MUPS also had a higher rate of consultations with other health care providers, including nurses, chiropractors, physiotherapists, psychologists, social workers and counsellors: 48% versus 34%.

Rates of overnight hospitalization in the past year, an indication of more severe illness, were 15% for those with MUPS and 8% for those without MUPS.

Some of this high health care use may be attributable to referrals. In the

Figure 1
Health care use and unmet needs in past year, by medically unexplained physical symptoms (MUPS) status, household population aged 25 or older, Canada, 2014



[E] interpret with caution
* significantly different from No MUPS ($p < 0.05$)
Source: 2014 Canadian Community Health Survey.

absence of an explanation for symptoms, patients may be referred to practitioners in various domains.[1]

Despite their high rates of consultation with medical practitioners, people with MUPS were more likely than those without MUPS to report needing but not receiving health care in the past 12 months: 25% versus 11%. The elevated prevalence of unmet health care needs among MUPS patients may reflect difficulties obtaining a diagnosis and treatment.[18]

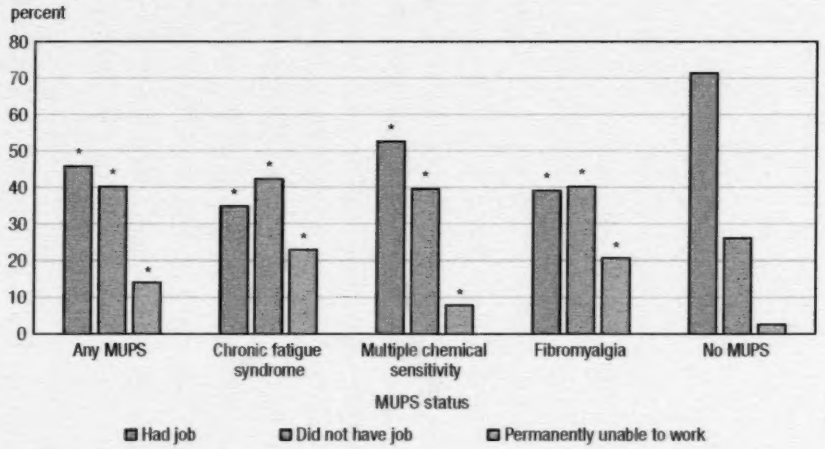
Labour market participation

People with MUPS were more likely than those without MUPS to not have a job or to be permanently unable to work. An estimated 40% of those with MUPS did not have a job in 2014, compared with 26% of those without MUPS (Figure 2). The percentage without a job was particularly high among people with multiple chemical sensitivity: 53%.

Overall, 45% of people with MUPS were employed. Among this group, 18% reported a work absence due to a chronic health condition during the past three months, compared with 5% of workers without MUPS (Figure 3).

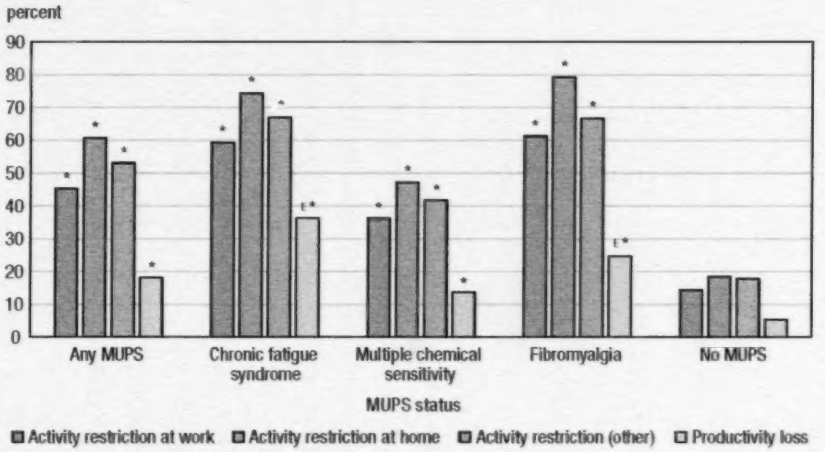
People with MUPS experienced restrictions in several domains. In 2014, 45% reported that a long-term physical or mental condition or health problem "often" or "sometimes" reduced the amount or the kind of activity they do at work; 14% of those without MUPS reported activity restrictions at work. A majority (61%) of people with MUPS reported activity restrictions at home; the figure among those without MUPS was 19%. Restrictions were also apparent for activities such as transportation and leisure.

Figure 2
Labour force status, by medically unexplained physical symptoms (MUPS) status, household population aged 25 to 75, Canada, 2014



* significantly different from No MUPS ($p < 0.05$)
Source: 2014 Canadian Community Health Survey.

Figure 3
Prevalence of activity restriction/productivity loss due to chronic illness, by medically unexplained physical symptoms (MUPS) status, household population aged 25 to 75, Canada, 2014



E interpret with caution
* significantly different from No MUPS ($p < 0.05$)
Source: 2014 Canadian Community Health Survey.

Conclusion

In 2014, more than a million Canadian adults aged 25 or older reported having been diagnosed with MUPS. They were more likely than other Canadians to use health care services, but also more likely to report that their health care needs were not met. MUPS had a major effect on their economic activities: 40% did not have a job, and one in five who were employed reported a recent work absence due to a chronic condition.

The data

Data sources

The 2014 Canadian Community Health Survey (CCHS) collected information on health status, health care use and health determinants for about 98% of the population aged 12 or older. It covered household residents in the provinces and territories. Members of the Canadian Forces and residents of institutions, Indian reserves, other Aboriginal settlements, and some remote areas were excluded. The response rate was 65.6%. The analytical sample contained 54,166 people aged 25 or older, representing 24.5 million Canadians.

The 2012 Canadian Community Health Survey–Mental Health (CCHS-MH) collected data on mental health disorders from the population aged 15 or older in the 10 provinces. Exclusions were similar to the CCHS. The response rate was 68.9%, yielding an analytical sample of 21,100 people aged 25 or older, representing 23.9 million Canadians.

Analyses were conducted using SAS 9.3. Survey sampling weights were applied so that the analyses would be representative of the Canadian population. Bootstrap weights were applied using SUDAAN 11.0 to account for underestimation of standard errors due to the complex survey design.

Definitions

The presence of chronic physical conditions was established by asking respondents if a health professional had diagnosed them as having a condition that had lasted, or was expected to last, at least six months. The interviewer read a list of conditions that included chronic fatigue syndrome, fibromyalgia and multiple chemical sensitivity. Respondents who indicated they had at least one of the three conditions were classified as having *any MUPS*.

The number of *non-MUPS chronic physical conditions* was categorized into four groups: none, one, two, and three or more. Individual conditions were asthma, arthritis excluding fibromyalgia, back problems excluding fibromyalgia and arthritis, migraine headaches, COPD, diabetes, heart disease, cancer, stomach or intestinal ulcers, effects of stroke, urinary incontinence, bowel disorder, Alzheimer's disease or other dementia, and high blood pressure. Mood and anxiety disorder were combined to represent mental co-morbidity.

Highest level of household education was categorized as: postsecondary graduation or less than postsecondary graduation. *Household income* was the ratio of household income to the low-income cut-off[19] and divided into quintiles. *Marital status* was categorized as having a partner (married/common-law) or not (single/separated/divorced/widowed). *Cultural identity/Race* was defined as white or non-white.

Respondents were classified according to whether they had seen or talked to a family doctor or general practitioner about their physical, emotional or mental health at least 10 times in the past 12 months.[20] Consultations with with specialists (such as a surgeon, allergist, orthopedist or psychiatrist), nurses, chiropractors, physiotherapists, psychologists or social workers/counsellors were also reported. An overnight stay in the past 12 months pertained to stays in a hospital, nursing home or convalescent home.

Mental health consultations refer to having seen or talked to a health professional about emotional or mental health.

Individuals were considered to have unmet health care needs if they reported a time during the past 12 months when they felt that they needed health care but did not receive it.

Activity restriction was based on a response of "often" or "sometimes" (versus "never") to the questions: "Does a long-term physical condition or mental condition or health problem, reduce the amount or the kind of activity you can do . . .

- . . . at home?"
- . . . at school?"
- . . . at work?"
- . . . in other activities, for example, transportation or leisure?"

Respondents younger than 75 were classified as having been employed in the past three months if they had worked at a job or business or had been absent from work. Among those absent from work, absences caused by a chronic condition were identified.

The 2012 CCHS-MH measured the prevalence of six mental disorders (major depressive episode, bipolar disorder, generalized anxiety disorder, and abuse of or dependence on alcohol, cannabis or other drugs) in accordance with the World Health Organization version of the Composite International Diagnostic Interview 3.0.[21]

Limitations

Exclusion of the institutionalized population from the analysis may result in underestimates of the prevalence of MUPS. Caution should be exercised in interpreting findings about mental health disorders based on the 2012 CCHS-MH, as the dataset does not include the territories or information about fibromyalgia. Because the surveys were cross-sectional, temporal order cannot be inferred.

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